File Dec 82

IC STAFF

Routing Slip

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SUSPENSE: _____ Date

REMARKS:

Done 1-3 Dec 82

30 December 1982

STAT

Director, Intelligence Community Staff
1724 F Street N/W
Washington, D.C. 20006

Dear [redacted]

STAT

At present, my group at SAI is working for you as your SETS contractor. Other activities in the group have produced color graphics display capabilities which I thought might interest you and your staff.

Over the last several years, SAI has developed a significant digital map display and color graphics capability as a result of our National Training Center (NTC) contracts for the Army, other defense contracts, as well as our own in-house investments. This capability is now available in a small, stand-alone, work station we call TOPS (Training Operations and Planning Station). TOPS combines the latest commercially available mini-computer and mass storage hardware technology with the latest digital map and interactive color graphics software technology to achieve very effective man-machine information transfer.

Digital map, color graphic displays are generated from DMA supplied data bases including Digital Terrain Elevation Data (DTED) and Digital Feature Analysis Data (DFAD). Potential applications of TOPS include military capabilities planning, intelligence processing, force employment, combat analysis, training or test range management and other areas where map displays are particularly useful.

You and your staff are invited to see, at your convenience, a demonstration of TOPS in our Crystal City office. Demonstrations are scheduled for January 18th through January 28th at 2361 S. Jefferson Davis Highway, Suite 320, third floor. The local point of contact for demonstration appointments is Mr. Sam Schrage at (703) 979-5900.

Enclosed is a brochure on SAI's National Training Center efforts. Included are inserts with examples of the digital map displays, a photograph of TOPS and a brief description of the TOPS demonstrations available in January.

Science Applications, Inc. 1200 Prospect St., P.O. Box 2351, La Jolla, CA 92038, (714) 454-3811
Other SAI Offices: Albuquerque, Ann Arbor, Arlington, Atlanta, Boston, Chicago, Huntsville, Los Angeles, McLean, Palo Alto, San Diego, Sunnyvale, and Tucson.

I hope I have a chance to see you again and brief you on TOPS. Further, I propose to follow up this communication with a telephone call to facilitate scheduling.

Sincerely yours,

SCIENCE APPLICATIONS, INC.

John H. Warner, Jr.

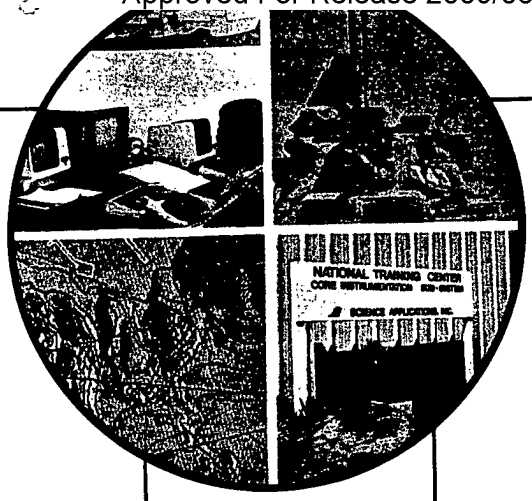
John H. Warner, Jr.
Senior Vice President
General Manager,
Systems Applications Group

JHW:jmd

enclosures

cc: J. Doran (SAI/LJ)
D. Erickson (SAI/LJ)
G. Higgins (SAI/McL)
S. Schrage (SAI/CC)

SAI
ON TARGET FOR THE
NATIONAL TRAINING CENTER



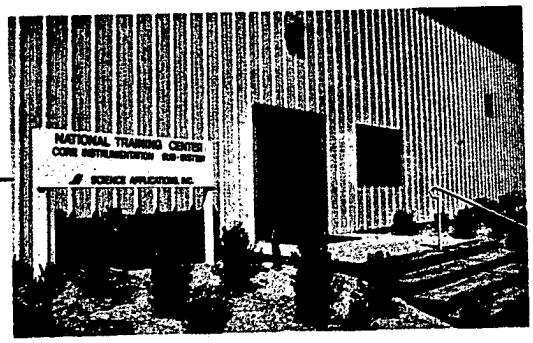
Science Applications, Inc.

Design, Development, Integration, Test, and Operation:

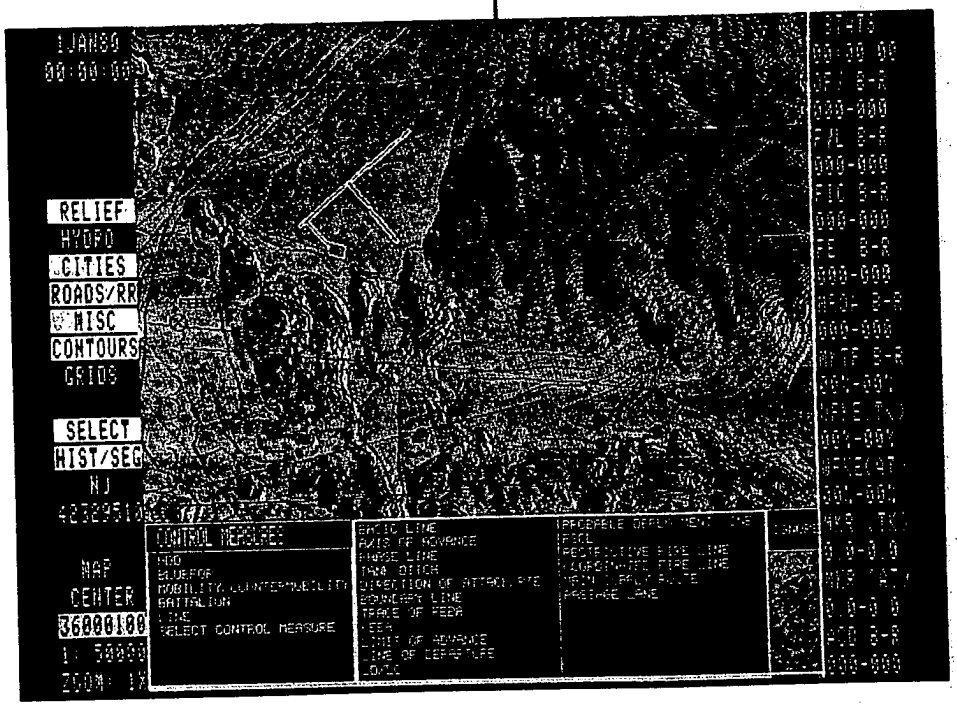
A Total Systems Approach

Fully instrumented NTC player units like the armored vehicles (below) are linked to a Command Center, where evaluation and review takes place via a sophisticated Monitoring and Control System created by SAI.

Software for the NTC Monitoring and Control System was created at SAI's Software Development Facility (above.) Equipped with two VAX 11/780 minicomputers and five LSI 11/23 based graphics stations, this facility is capable of addressing the most sophisticated design problems and of testing the resulting solutions.

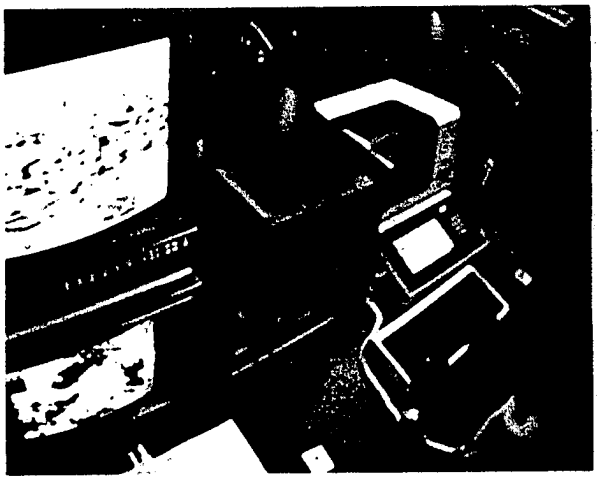


To house the SAI-designed and developed Core Instrumentation Subsystem — which is the heart of the NTC instrumentation system — SAI constructed a 24,000-square-foot facility (left) at Fort Irwin, Calif.



SAI has created a digital terrain map of the Fort Irwin exercise area (left) that permits real-time display of all battlefield activities. Graphics symbology depicting player-unit identity (i.e., tank, TOW, APC) and location, as well as an array of geographic and physical features, may be overlaid on the map at will, while side panel displays (far right) provide additional pertinent operational data. When requested interactively, a new terrain display will be generated in less than one second.

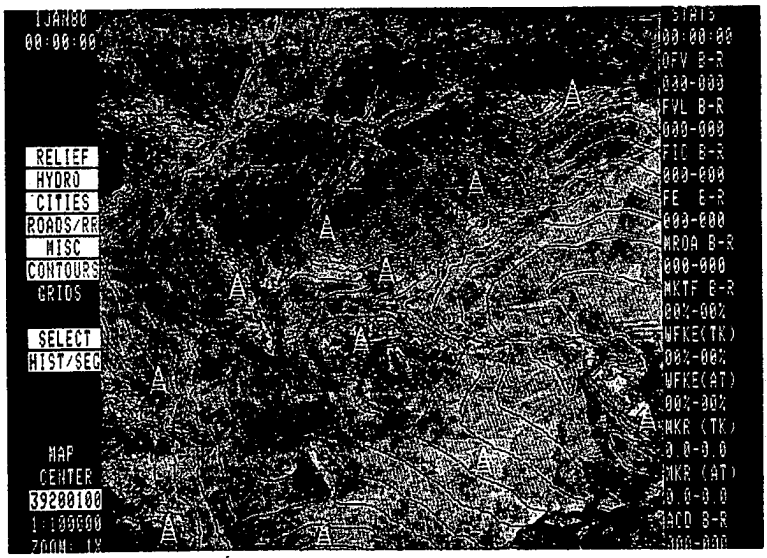
SAI DIGITAL-MAP COLOR GRAPHICS



4. ***Vehicle Mobility*** *is one example of a weapon-system performance display. Slope, soil type, vegetation, weather and hydrographic data are combined with vehicle performance characteristics to generate this display. Darker areas indicate reduced mobility. Lighter areas indicate increased mobility.*

5. ***Single-Sensor Terrain Masking*** *is shown in black out to 30km from one antenna. Sensor effectiveness versus positioning can be explored rapidly with such displays. More complex displays for clutter and other sensor-performance phenomena can be generated.*

6. ***Multisensor Terrain Masking*** *is shown at right. The red area corresponds to regions viewed by 3 or fewer sensors. The non-red area corresponds to regions viewed by 4 or more sensors. The lighter the region, the more sensors that can view the region. Secondary streaming or ray effects are visible where a particular sensor can see through a gap but not through adjacent hills.*



For further information, contact:

Dr. Dave Erickson or Mr. Ray Galka
Science Applications, Inc.
P.O. Box 2351
La Jolla, California 92038
Telephone (714) 454-3811

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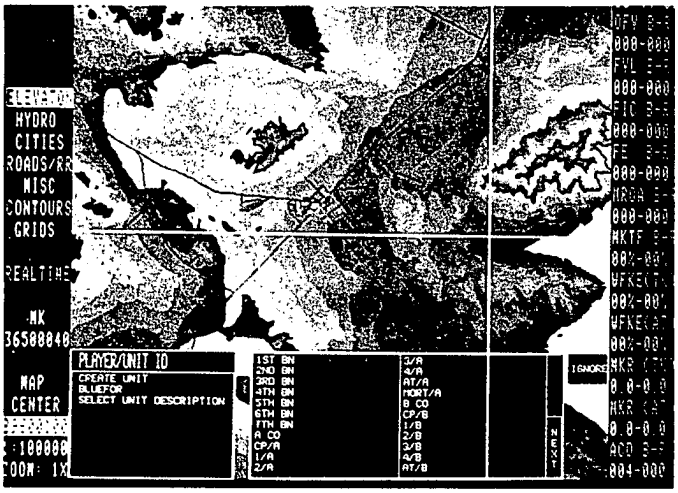
SAI DIGITAL-MAP COLOR GRAPHICS

Through participation in programs like the U.S. Army's National Training Center (NTC), SAI has developed significant capabilities in digital-map color graphics. At right is a standard NTC work station containing a digital-graphics color monitor, a digitizing tablet, two CRTs and a color video display.

Using DMA digital terrain data, digital background displays are generated for two basic applications: (1) background maps and (2) weapon and sensor-system performance displays, which also can be used as background displays. A partial list of selectable features for all displays includes: contour lines, roads, rivers, urban areas, map scaling, zoom, pan or scroll, real-time or historical combat information overlays, interactive menus and side-panel information. Displays can be generated for Eastern and Western Europe, European Russia and many other areas in the world.



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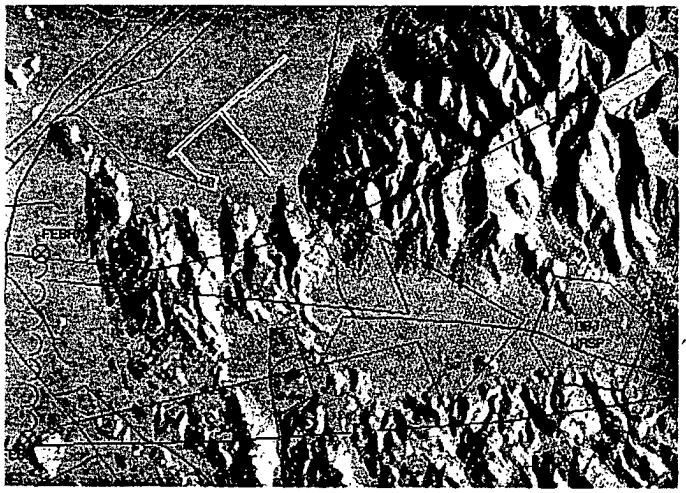


2

1. ***Elevation Contours*** *represent one type of background map. Color variations depict different elevation bands. The example interactive menu shown provides easy man-machine interaction.*

2. ***Terrain Relief*** *represents another type of background map. Used most frequently at NTC for terrain representation, this type of display can be generated using various sun positions to enhance visualization. Combat information can be overlaid for real-time or historical displays.*

3. ***Terrain-Perspective*** *background maps can be generated for a given viewer location, (X,Y,Z), field of view and angle of view. This display can be generated in real time to show a pilot's or a vehicle driver's perspective of the terrain.*

3

SAI SYSTEMS INTEGRATION

The automated battlefield has made advanced computer technology essential to the operation of today's military. Science Applications, Inc., is a recognized leader in the design, development, and integration of complex computer-based systems. Areas in which this expertise currently is being applied include:

Command and Control Systems
Mission Planning Systems
Intelligence Fusion Centers
Operations and Maintenance
Advanced Unit Training Systems
Test and Training Ranges

THE NATIONAL TRAINING CENTER

Indicative of the skill with which SAI integrates operations, software, and hardware is the company's participation in the U.S. Army's National Training Center. The monitoring and control system SAI designed and installed at Fort Irwin, Calif., links an array of technologies to help provide the most realistic display of battlefield conditions ever afforded a modern army in peacetime.

Having played a major role in the NTC since the program's inception, SAI has provided:

Requirements Definition
Design, Development, and Integration
Installation and Testing
Integrated Logistics Support
Operations and Maintenance
Training Technology

Currently, the company is responsible for developing, installing, and testing the many components of the Core Instrumentation Subsystem (CIS), which is the real-time control center for the NTC instrumentation system. Housed in a 24,000-square-foot facility designed and constructed by SAI, the CIS consists of four shared-memory DEC VAX 11/780 minicomputers netted to 42 high-resolution color graphics stations, each with its own LSI 11/23 microprocessor, along with other digital, video, and audio recording and editing equipment.

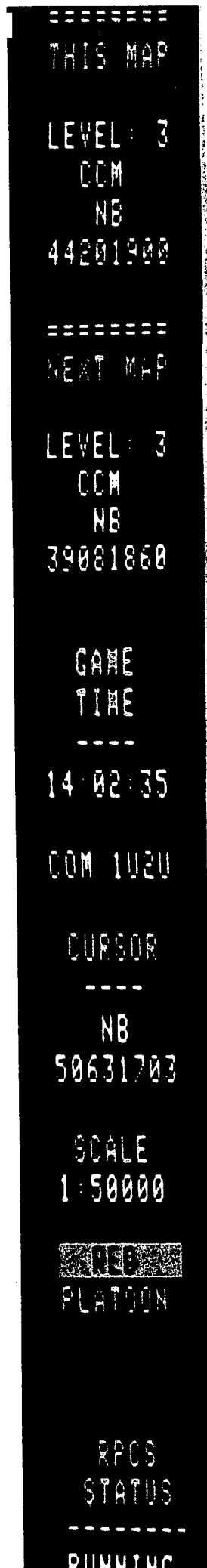
Army personnel trained by SAI will use the CIS to monitor and control all range activities and to collect, process, and organize digital, video, and audio data for after-action reviews and training feedback. Two specially equipped mobile training display vans will also be provided for near-real-time after-action reviews in the exercise area.

SOFTWARE DEVELOPMENT

The NTC software package is the most advanced interactive system ever devised for army training. Developed at SAI's state-of-the-art Software Development Facility in La Jolla, Calif., it permits all field data and activities to be processed instantaneously and displayed in easily understood graphic and alphanumeric formats.

The digitized map SAI created for the NTC extends the state of the art, enabling an entire series of symbols and map attributes to be displayed in a fraction of a second. Moreover, operation of the display console requires no prior knowledge of computers. Software and hardware testing, as well as operational training, is accomplished through an interactive battlefield simulation system (the NTC Test Support Driver), developed for NTC and based on the Combined Arms Tactical Training Simulator (CATTS) Math Model.

The monitoring and display system SAI has created for the NTC helps to ensure the innovative program's effectiveness. While permitting objective analysis of unit performance under realistic combat conditions, it assures—through feedback and critique—that the individual soldier derives maximum learning from the experience. SAI currently is applying this same skill to an extensive range of weapons systems and advanced research projects, furthering its goal of meeting imperative national needs for a stronger defense.



ON TARGET:
SAI
SYSTEMS APPLICATIONS GROUP

A Diverse Set of Capabilities

- System Engineering and Technical Assistance (SETA)
- System Design, Development, and Integration (H/W & S/W)
- Ground and Flight System Operational Software Development
- Operational Planning and Analysis Software Development
- Software Technology, Support Tools, and Maintenance
- System Simulation Model Development and Application
- Software Verification and Validation
- Strategic and Theater Weapon System and Combat Analyses

Meeting Critical Defense Needs

- Command/Control/Planning/Fusion Centers (H/W & S/W)
- Automated Training Systems
- Strategic System Operational Planning Software and Studies
- Avionics Architecture Simulations, Flight Software Development Systems (H/W & S/W)
- Selected Intelligence Activities
- Software Development and Maintenance Support (Tools, Services, etc.)
- Weapon System and Combat Analyses

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Science Applications, Inc., is a diversified high-technology research and development company specializing in the areas of National Security, Energy, Environment and Health, and High-Technology Products. Specific application skills are in Computer Systems and Software Engineering, Systems Engineering, Experimental and Laboratory Services, and Complex Issues Analyses. Founded in 1969, SAI is an employee-owned and operated company with revenues of about $300 million, more than 40 locations, and 4,000 employees.

SCIENCE APPLICATIONS, INC.

TOPS DEMONSTRATION IN CRYSTAL CITY

JANUARY 18-28, 1983

The Training Operations and Planning Station (TOPS) will be at the SAI office in Crystal City and available for demonstrations from January 18 through January 28. The address is 2361 South Jefferson Davis Highway, Suite 320, Third Floor. The point of contact for demonstration appointments in Crystal City is Mr. Sam Schrage. His telephone number is (703) 979-5900.

TOPS is a stand-alone color graphics station with its own VAX 11/730 computer. It is L-shaped and about 8' on a side. It has a color graphics processor, a color monitor and two CRT's. It contains extensive capabilities for digital map and color graphics presentations and has applications for military capabilities planning, intelligence processing, force employment, combat analysis, range management and for other areas where digital map displays are particulary useful. Color graphics demonstrations available include:

- DIGITAL BACKGROUND MAP DISPLAY USING DMA SUPPLIED DATA
  - VARIOUS MAP SCALES AND ZOOM LEVELS
  - BACKGROUNDS: VEGETATION, TRAFFICABILITY, TERRAIN RELIEF, ETC.
  - HYDROGRAPHY: RIVERS, LAKES
  - INFRASTRUCTURE: ROADS, RAILROADS, CITIES
  - ELEVATION CONTOURS AND GRID LINES
- TACTICAL SITUATION DISPLAYS (DYNAMIC AND STATIC SYMBOLOGY)
- REVIEW/REPLAY OF AN ACTUAL NATIONAL TRAINING CENTER EXERCISE
  - EXERCISE HISTORY SELECTION - INTERACTIVE MENU
  - HISTORIAN MODE REPLAY (REAL AND ACCELERATED TIME REPLAY)
- SENSOR LINE-OF-SIGHT COVERAGE
  - SINGLE AND MULTIPLE SENSOR TERRAIN MASKING
- PERSPECTIVE VIEW OF TERRAIN (HORIZONTAL VIEW)
  - STATIC VIEWS AND DYNAMIC FLIGHT OVER TERRAIN
- INTEGRATED BATTLEFIELD TRAINING (CONVENTIONAL AND NUCLEAR)
  - NTC TRAINING SCENARIO WITH NUCLEAR BURSTS
  - NUCLEAR EFFECTS AND CASUALTY ASSESSMENT
- SOVIET ICBM ATTACKS ON MX CSB WITH FRATRICIDE NUCLEAR EFFECTS
  - ONE-ON-ONE ATTACK SCENARIO
  - TWO-ON-ONE ATTACK SCENARIO
  - TEN-ON-ONE ATTACK SCENARIO

SAI

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